CDM

Memorandum

To: *Scott Supernaugh, CDM Construction Manager*

From: *Andrew Lasich, CDM Pittsburgh*

Date: *May 31, 2005*

Subject: *Former Stimson Maintenance Building Structural Review*

During the week of April 18th, I visited the former Stimson maintenance building to determine the load capacity of the existing high and low roofs and verify if these roofs can handle the additional load associated with Vermiculite removal. I also did a general review of the low roof to determine the condition of the existing roofing material.

History and Description

The part of the former Stimson maintenance building that I inspected was divided into two sections; a high roof section, also known as the former mobile shop, and a low roof section, also known as the former engineering and warehouse areas "A" and "B". Our inspection and evaluation is limited to the former mobile shop and the former engineering and warehouse area "A".

Both buildings are approximately 260 feet long (13 bays) by 54 feet wide for the high roof portion and 40 feet wide for the low roof portion. Their roof systems consist of 2 inch tongue and groove wood decking supported by wood beams spanning between main roof supports. At the high roof, the main roof supports are large wood trusses supported by wood columns at each end. Each truss has a single slope top chord (sloping north to south towards the lower roof) and are bottom chord bearing. The low roof main supports are large wood beams that are supported by a wood column at its center and at its southern end. The northern end of the low roof main support is attached to a high roof column.

Conclusion and Recommendations

Upon performing a limited inspection of both roofs, the structural decking and support members appear to be in relatively good structural conditions. Other than the overhang at the lower end of the high roof, I saw minimal damage at either roof. The problem spots I noticed are mentioned below.

High Roof:

1. At the lower end of the high roof there were portions of the decking that deteriorated. During and prior to Vermiculite removal at this roof level, I recommend that all individuals that go on the high roof to limit themselves from standing or walking on the decking at or near this overhang. Verify that the Vermiculite removal contractor acknowledges this problem and addresses it in their fall protection plan.

2. There appears to have been a portion of the roofing material that has been damaged and/or removed and repaired by covering the roof with a plastic tarp. This tarp was inadequately attached to the roof decking and is increasing the possibility for additional deterioration of the roof decking. I recommend that this tarp be removed immediately.

Low Roof:

1. The roofing material at the low roof is in acceptable condition and with some minor repairs and/or modifications should not need complete replacement for at least the next couple of years.

2. All roof penetrations not in use should be covered and the roofing material should be patched.

3. All roof penetrations to remain should be resealed (i.e. bituminous material reapplied) at their intersection with the roofing material.

4. At the roof's intersection with the wall of the high roof, the roofing material is damaged and needs repaired or replaced.

In addition to assessing the general condition of the low and high roofs, I did a structural appraisal to determine if these roofs could support the additional load associated with Vermiculite removal. My review was limited to the loads associated with Vermiculite removal and does not include recommendations for retrofitting the existing structure to bring it up to the current building code.

The following is a summary of the approximate allowable live loads for both the high and low roofs. The loads mentioned below are based on the live load capacity of either the roof decking, roof beams, or main roof supports.

1. High Roof Live Load: 25 psf.

2. Low Roof Live Load: 15 psf.

These findings are based on the assumptions that all wood members are similar to Douglas Fir – Larch grade No.2 and are in good condition (not deteriorating) and the approximate roof dead load is 21 psf for both roofs.

At the low roof, no additional framing or modifications are required for Vermiculite removal.

At the high roof, I have to agree with Eclipse Engineering and recommend that additional framing be provided as indicated in their letter dated January 31, 2005. In regards to Eclipse Engineering recommendations, I would ask them to provide alternate beam sizes (i.e. LVL beams and solid wood beams) in addition to the size and material they recommended. I would also ask them to clarify their recommendations given that they require an extensive effort and cost for removing the existing roofing material. I would have them indicate where they encountered the deteriorating roof decking and if it was necessary to provide additional framing under all of the roof decking. They should be able to provide additional recommendation on how to field verify the conditions of the roof decking to determine if the material is in acceptable condition (no additional framing required) or not.

In lieu of providing additional framing as recommended by Eclipse Engineering, the Vermiculite removal contractor can provide temporary shoring similar to the Eclipse Engineering recommendations. This shoring should be at a similar spacing and capable of supporting 25 psf dead load and live load. The contractor will be required to submit additional calculations for the temporary shoring signed and sealed by a professional engineer registered in Montana.

Once the existing lightweight concrete slab is completely removed, replacement and repair of the high roof can commence. Removing this slab will significantly reduce the roof dead load; therefore, no additional shoring or framing will be required for the re-roofing work. Extreme caution should be used by the roofing contractor while replacing and/or repairing the roof since it was not completely inspected for deterioration.

Both the roofing and Vermiculite removal contractors should use the necessary fall protection/arrest systems while working on either the high or low roof.

Please do not hesitate to contact me if you have any questions or need additional information.

Sincerely,

Andrew Lasich, P.E.